WHAT IS CLAIMED IS:

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2   1.   A method for initializing a node in a network, the network including a

3 plurality of nodes connected by first and second rings formed by two or more transmission

4 media, the method comprising:

5   connecting the node to each of the first and second rings;

6   setting a locally significant ring identifier for each of the first and second rings

7 without concern for the ring identifier established by any other node in the network for either

8 of the two rings;

9   discovering the locally significant ring identifiers for each other node coupled to the

10 network;

11   storing the locally significant ring identifiers and associated node addresses for each

12 node in the network; and

13   determining routing decisions for one or more packets received at the node along

14 each of the first and second rings using the locally significant identifiers associated with a

15 node that sent the packets.

1   2.   The method of claim 1, wherein the step of storing further comprises storing

2 the locally significant ring identifiers and associated node addresses for each ring in a table.

1   3.   The method of claim 2, wherein step of discovering the locally significant ring

2 identifiers includes

3   generating a topology packet including the locally significant identifier for a ring and

4 the address of the node and sending the topology packet to a next node in the network;

5   receiving a topology packet back on the ring that includes an address for each node

6 on the network coupled to the ring including a locally significant identifier for the ring for

7 each node; and

8   storing the locally significant identifier for the ring for each node.

1　　　　4. A method for initializing a node in a network, the network including a plurality of

2　nodes connected by first and second rings formed by two or more transmission media, the

3　method comprising:

4　　　　connecting the node to each of the first and second rings;

5　　　　determining a ring identifier for each of the first and second rings coupled to the node

6　after connection;

7　　　　discovering topology information for the network including the identity of each node

8　coupled to each ring;

9　　　　storing the topology information; and

10　　　　　　determining routing decisions for one or more packets received at the node

11　　　　　　along each of the first and second rings using the ring identifier information.

1　　　　5.　　　The method of claim 4, wherein the process of determining a ring identifier

2　for each of the first and second rings includes

3　　　　　　generating a ring query packet that includes a proposed ring identifier for one

4　ring;

5　　　　　　forwarding the ring query packet to a next node on the one ring; and

6　　　　　　waiting for a response that includes information for determining a correct ring

7　identifier for the one ring.

1　　　　6.　　　The method of claim 5, wherein the step of waiting for a response includes

2　　　　　　if a broadcast identifier is received that indicates an identity for one of the first

3　or second rings, then assigning ring identifiers for the node in accordance with the broadcast

4　identifier.

1　　　　7.　　　The method of claim 5, wherein the step of waiting for a response includes

2　　　　if the ring query packet is returned on the one ring,

3　　　　　　setting the ring identifier for the one ring to the proposed ring identifier,

4　　　　　　setting a ring identifier for a second one of the first and second rings to a

5　　　　complementary value, and

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6   broadcasting the ring identifier on the one ring.

1   8.   The method of claim 5, wherein the step of waiting for a response includes

2   receiving a response from another node on the network that includes an indication of a

3   correct ring identifier for the one ring and setting the ring identifier for the one ring to the

4   correct ring identifier.

1   9.   The method of claim 5, wherein the step of waiting for a response includes

2   receiving a ring query packet on the one ring from another node;

3   evaluating the received ring query packet to determine if the query should be

4   forwarded on the one ring; and

5   if the received ring query packet is to be forwarded, waiting for a broadcast identifier

6   indicating a correct ring identifier for the one ring.

1   10.   The method of claim 9, wherein the step of evaluating includes

2   comparing the addresses of the node that generated the received ring query packet

3   and the node,

4   determining which node, among the node that generated the received ring query and

5   the node, should set the ring identifier for the one ring, and

6   if the node is to set the ring identifier for the one ring, then dropping without

7   forwarding the received ring query packet else forwarding the received ring query packet to a

8   next node on the one ring.

1   11.   The method of claim 10, wherein the step of determining includes selecting a

2   node with the highest MAC address.

1   12.   The method of claim 10, wherein the step of determining includes selecting a

2   node with the lowest MAC address.

1   13.   The method of claim 4, wherein the step of determining a ring identifier for

2   each of the first and second rings coupled to the node after connection includes

3   setting a locally significant ring identifier for each of the first and second rings

4   without concern for the ring identifier established by any other node in the network for either

5   of the two rings;

6   discovering the locally significant ring identifiers for each other node coupled to the

7   network and

8   storing the locally significant ring identifiers and associated node addresses for each

9   node in the network; and

10   where the determining step includes determining routing decisions for one or more

11   packets received at the node along each of the first and second rings using the locally

12   significant identifiers associated with a node that sent the packets.

1   14.   The method of claim 13, wherein the step of storing further comprises storing

2   the locally significant ring identifiers and associated node addresses for each ring in a table.

1   15.   The method of claim 14, wherein the step of discovering the locally

2   significant ring identifiers includes

3   generating a topology packet including the locally significant identifier for a ring and

4   the address of the node and sending the topology packet to a next node in the network;

5   receiving a topology packet back on the ring that includes an address for each node

6   on the network coupled to the ring including a locally significant identifier for the ring for

7   each node; and

8   storing the locally significant identifier for the ring for each node.

1   16. A method for initializing a node in a network, the network including a plurality

2   of nodes connected by first and second rings formed by two or more transmission media, the

3   method comprising:

4   connecting the node to each of the first and second rings;

5   determining a ring identifier for each of the first and second rings coupled to the node

6   after connection including

7   generating a ring query packet that includes a proposed ring identifier for one

8   node;

9   forwarding the ring query packet to a next node on the one ring; and

10   waiting for a response that includes information for determining a correct ring

11   identifier for the one ring; and

12   determining routing decisions for one or more packets received at the node

13   along each of the first and second rings using the ring identifier information.

1   17.   The method of claim 16, wherein the step of waiting for a response includes

2   if a broadcast identifier is received that indicates an identity for one of the first

3   or second rings, then assigning ring identifiers for the node in accordance with the broadcast

4   identifier.

1   18.   The method of claim 16, wherein the step of waiting for a response includes

2   if the ring query packet is returned on the one ring,

3   setting the ring identifier for the one ring to the proposed ring identifier,

4   setting a ring identifier for a second one of the first and second rings to a

5   complementary value, and

6   broadcasting the ring identifier on the one ring.

1   19.   The method of claim 16, wherein the step of waiting for a response includes

2   receiving a response from another node on the network that includes an indication of a

3   correct ring identifier for the one ring and setting the ring identifier for the one ring to the

4   correct ring identifier.

1   20.   The method of claim 16, wherein the step of waiting for a response includes

2   receiving a ring query packet on the one ring from another node;

3   evaluating the received ring query packet to determine if the query should be

4   forwarded on the one ring; and

5   if the received ring query packet is to be forwarded, waiting for a broadcast identifier

6   indicating a correct ring identifier for the one ring.

1   21.   The method of claim 20, wherein the step of evaluating includes

2   comparing the addresses of the node that generated the received ring query packet

3   and the node,

4   determining which node, among the node that generated the received ring query and

5   the node, should set the ring identifier for the one ring, and

6   if the node is to set the ring identifier for the one ring, then dropping without

7   forwarding the received ring query packet else forwarding the received ring query packet to a

8   next node on the one ring.

1   22.   The method of claim 21, wherein the step of determining includes selecting a

2   node with the highest MAC address.

1   23.   The method of claim 21, wherein the step of determining includes

2   selecting a node with the lowest MAC address.

1   24.   A computer program for initializing a node in a network, the network

2   including a plurality of nodes connected by first and second rings formed by two or more

3   transmission media, the computer program including instructions for causing a computer to:

4   connect a node to each of the first and second rings;

5   set a locally significant ring identifier for each of the first and second rings without

6   concern for the ring identifier established by any other node in the network for either of the

7   two rings;

8   discover the locally significant ring identifiers for each other node coupled to the

9   network;

10   store the locally significant ring identifiers and associated node addresses for each

11   node in the network; and

12   determine routing decisions for one or more packets received at the node along each

13   of the first and second rings using the locally significant identifiers associated with a node

14   that sent the packets.

1   25. A computer program for initializing a node in a network, the network including a

2   plurality of nodes connected by first and second rings formed by two or more transmission

3   media, the program including instructions for causing a computer to:

4   connect the node to each of the first and second rings;

5   determine a ring identifier for each of the first and second rings coupled to the node

6   after connection;

7   discover topology information for the network including the identity of each node

8   coupled to each ring;

9   store the topology information; and

10   determine routing decisions for one or more packets received at the node along each

11   of the first and second rings using the ring identifier information.

1   26. A computer program for initializing a node in a network, the network

2   including a plurality of nodes connected by first and second rings formed by two or more

3   transmission media, the program including instructions for causing a computer to:

4   connect the node to each of the first and second rings;

5   determine a ring identifier for each of the first and second rings coupled to the node

6   after connection including

7   generating a ring query packet that includes a proposed ring identifier for one

8   node;

9   forwarding the ring query packet to a next node on the one ring; and

10   waiting for a response that includes information for determining a correct ring

11   identifier for the one ring; and

12   determine routing decisions for one or more packets received at the node along each

13   of the first and second rings using the ring identifier information.

1   27. A node in a network, the network including a plurality of nodes connected by

2   first and second rings formed by two or more transmission media, the node comprising:

3   an interface for connecting the node to each of the first and second rings;

4   means for setting a locally significant ring identifier for each of the first and second

5   rings without concern for the ring identifier established by any other node in the network for

6   either of the two rings;

7   means for discovering the locally significant ring identifiers for each other node

8   coupled to the network;

9   a memory for storing the locally significant ring identifiers and associated node

10   addresses for each node in the network; and

11   logic for determining routing decisions for one or more packets received at the node

12   along each of the first and second rings using the locally significant identifiers associated

13   with a node that sent the packets.

1   28. A node in a network, the network including a plurality of nodes connected by

2   first and second rings formed by two or more transmission media, the node comprising:

3   an interface for connecting the node to each of the first and second rings;

4   means for determining a ring identifier for each of the first and second rings coupled

5   to the node after connection;

6   means for discovering topology information for the network including the identity of

7   each node coupled to each ring;

8   a memory for storing the topology information; and

9   logic for determining routing decisions for one or more packets received at the node

10   along each of the first and second rings using the ring identifier information.

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